NASA SBIR/STTR Technologies

H13.01-9476 - Multifunctional Compton Inspection Tool

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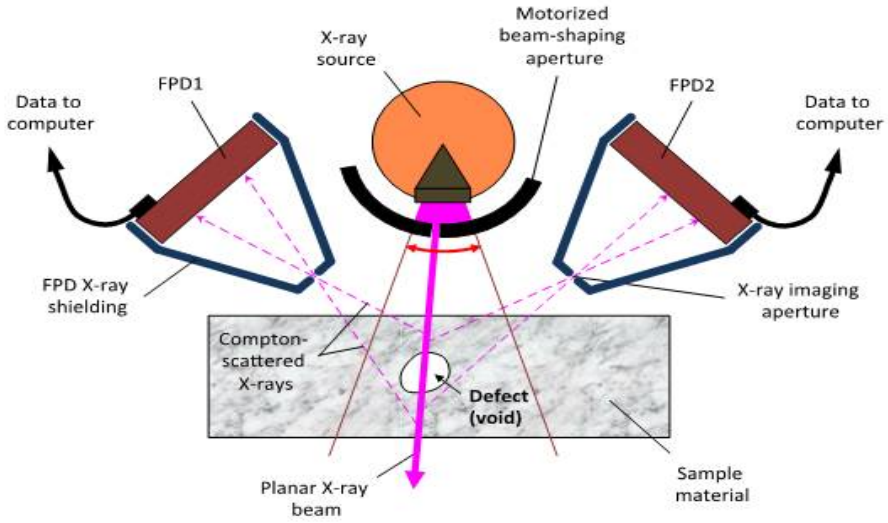
Identification and Significance of Innovation

Physical Optics Corporation (POC) proposes to develop a new Multifunctional Compton Inspection Tool (MCIT) for operation onboard the International Space Station (ISS), based on POC's previously invented Compton imaging tomography (CIT) nondestructive evaluation (NDE) approach. The MCIT incorporates new features and modifications of the CIT, which permit it to operate in multiple modes with enhanced functionality, smaller form factor, and smaller weight. MCIT will allow noncontact, single-sided NDE of spacecraft structures (such as MMOD shields, pressure vessels, ISS modules, and thermal protection systems (TPS) of visiting spacecraft).



Estimated TRL at beginning and end of contract: (Begin: 3 End: 4)

Technical Objectives and Work Plan

Technical Objectives
1. Development of a preliminary design of the MCIT.
2. Development of MCIT key technologies.
3. Integration, testing, and evaluation of the MCIT prototype.
4. Analysis of the commercial potential of the MCIT technology.

Work Plan
1. Define the Target MCIT Operating Parameters
2. Design the Phase I MCIT Prototype
3. Develop Motorized X-Ray Beam Shaping Aperture
4. Develop Software for CIT Reconstruction of "Motionless" Scans
5. Develop the Real-Time, Stereoscopic Imaging Technique
6. Fabricate and Test the Phase I MCIT Prototype
7. Explore the Commercial Potential and Product Viability
8. Prepare and Submit Reports

NASA Applications

In situ, single-sided, tomographic NDE of the integrity of spacecraft components and structures onboard the International Space Station (ISS), generic NDE of lightweight spacecraft materials used in the development of advanced aircraft and spacecraft, such as porous ceramics, carbon-carbon composites, metal honeycomb layers, fiberglass, Kevlar®, and aluminum alloys.

Non-NASA Applications

Noncontact NDE of composite and multilayer structures in military and civilian aircraft, detection of corrosion and cracks, reverse engineering.

Firm Contacts

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NON-PROPRIETARY DATA